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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,331	09/19/2006	Shinzou Hayashi	129495	7426

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EXAMINER	
HOBAN, MATTHEW E	
ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/593,331	HAYASHI ET AL.	
	Examiner	Art Unit	
	Matthew E. Hoban	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/3/2009 has been entered.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-8 rejected under 35 U.S.C. 102(b) as being anticipated by Beall in US6541407.

Beall teaches a cordierite porous body, comprising at least Si as a chemical component. This body is formed by mixing a silicon source with a source of talc, alumina and kaolin, as well as methyl cellulose. Silicon sources include diatomaceous and zeolite, which are both porous silica sources. These chemicals are kneaded together and then extruded in the form of a honeycomb structural body (which is a continuous forming

process) (See Column 3, lines 5-20). The formed mass is then dried and fired. The structure of Beall is said to be useful as a diesel particulate filter (see Abstract).

In reference to Claims 1-3: Beall discloses a ceramic porous body comprising a silica, alumina, kaolin, and talc source with methyl cellulose. Suitable silica sources as stated by Beall include zeolite and diatomaceous silica, which are both porous sources (See the paragraph bridging columns 7 and 8). This composition is mixed (i.e. made into a clay), shaped and subsequently dried and fired (See Column 3, lines 5-20). It is noted that the examples as outlined in Column 8 of Beall that the final product is of cordierite, meaning that the silica was melted in the process and formed cordierite. Seeing that cordierite was formed (**Relevant to Claim 3**) from precursors, which didn't include cordierite, several of the components had to have melted to form cordierite (**Relevant to Claim 2**). This must be true as seen in the exemplary method outlines in Column 8, Lines 40-65 includes a firing step wherein the shaped body is fired at a temperature between 1405 and 1430 Celsius. Beall states at Column 4, Lines 20-25 that the percent porosity of the final cordierite body is at least 47% by volume in the most desired scenario. As the method and materials used are similar to those of the claims, some great percentage of this porosity must be attributed to the porous silica precursor.

In reference to Claims 4: Diatomaceous silica is an amorphous variety of silica, which is also extremely porous.

In reference to Claims 5-6: Specific reference is made to the two evidentiary documents provided, which both entail MSDS information, reporting the dry density of commercially available diatomaceous silica in the range between 9.5-13 lbs/cubic ft (.15-.21 g/cc) or alternatively another product is listed as being between .3 and .5 g/cc. Thus the diatomaceous earth inherently posses the property of having a bulk density between .2 and 1 g/cc.

In reference to Claim 8: In line 48 of Column 8, Beall explicitly states that the mixture of ingredients can be extruded into a cellular honeycomb body.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Beall in US6541407.

Beall teaches a cordierite porous body, comprising at least Si as a chemical component. This body is formed by mixing a silicon source with a source of talc, alumina and kaolin, as well as methyl cellulose. Silicon sources include diatomaceous and zeolite, which are both porous silica sources. These chemicals are kneaded together and then extruded in the form of a honeycomb structural body (which is a continuous forming process) (See Column 3, lines 5-20). The formed mass is then dried and fired. The structure of Beall is said to be useful as a diesel particulate filter (see Abstract).

Regarding Claim 7: In his general teachings, Beall is silent as to the proportion of silica used in creation of the honeycomb body. However, in his examples, Beall only shows successful examples where the amount of silica used is less than 30% based on

the weight of the mixture. Based on this fact, one of ordinary skill would find it obvious to use a similar proportion in his general teachings to arrive at a cordierite body, since cordierite refers to a chemical composition, and such a chemical composition could not be achieved if the proportion of precursors was dramatically different from those shown. One would thus be motivated to use this amount of silica to achieve Beall's purpose of creating a cordierite body.

7. Claims 1, 4-6, and 8-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Felthouse in 5264200 in view of Winyall in 3203760.

Regarding Claim 1, 4-6, 9, 19-20: Felthouse gives a method of making a catalyst support from both low density, high porosity silica and low surface area silica (See Column 8, Lines 10-60). In this method the two silica species are mixed with one another and with a silicone resin to produce a dough (clay), and is then formed using extrusion (a continuous process), preferably with square cells (thus having partition walls). These monoliths are washcoated with a suitable catalyst and subsequently heated (fired) tat 100-150C, followed by a further firing step at 500-800C (Column 10, Lines 35-55). After this firing, the product would be considered a formed product as dictated in claim 19. Since the monolith made by Felthouse's method is made entirely of silica, the porosity must be a virtue of the silica. Furthermore, at Column 9, Lines 10-20, Felthouse states that the overall porosity of the monolith is from .5-2 cc/g. Since the

monolith is purely silica, the % porosity can be determined from the density of silica. Dense amorphous silica (fused silica) has a density of 2.2 g/ml. Therefore, for every cubic centimeter of solid material, there is from 1.1 to 4.4 cubic centimeters of pores. Therefore, the porosity of the monoliths created by the method of Felthouse, are always over 50%.

(Note: Claims 19-20 currently state "silica gel granules or silica gel granules and water-absorbing polymer particles"; the water- absorbing particles are seen as an optional ingredient based on this syntax. Further, the addition of silicone resin, might read on this aspect on the claim if it were to be made non-optional, although this determination isn't being made at this time due to the optional nature of the element.)

Felthouse speaks generally of the silica used in his process, only stating general ranges of particle size and useful surface area ranges. He is silent to the specifics of the silica used in such a monolith.

However, Winyall, who creates a silica gel suitable as a subcomponent of ceramic structure, teaches a silica gel composition (amorphous silica) meeting the requirements of Felthouse's process. Winyall's silica gel as seen in Examples III or IV, which have a surface area of 229 and 250 square meters per gram respectively, with an average particle size between 10 and 20, and 0-10 microns respectively. These are the two

major considerations as outlined by Felthouse, which are used in determining a suitable high-porosity, low density silica.

It would be obvious to use the silica gel of Winyall in the process of Felthouse to one of ordinary skill in the art, based on the fact that the silica gel of Winyall meets all of the requirements as set out by Felthouse. Therefore, one of ordinary skill would be motivated to use this silica gel, as Felthouse does not specify a suitable silica in greater terms than these properties alone. One of ordinary skill would thus expect favorable results as the silica gel of Winyall meets all the requirements taught by Felthouse, and Winyall also teaches that his silica gel is suitable as a component in ceramic products.

Regarding Claim 5-6: The silica gel taught by Winyall in Example III has a bulk density of 42.8 pounds per cubic foot, which converts to .686 g/cc.

Regarding Claim 8: The process of Felthouse includes the extrusion of the silica/resin mixture into a cellular (honeycomb) monolith.

Regarding Claim 10 and 17: The D_{50} of Winyall's silica gel taught in Example III is between 10 and 20 microns. D_{10} is in the range from 4-10 microns. Therefore it is reasonable to assume that the ratio between D_{10} and D_{50} is met based on the air elutriation results presented by Winyall. The D_{90} value as observed is between 20 and

30 microns. Therefore it is reasonable to assume that the ratio between D_{10} and D_{50} is met based on the air elutriation results presented by Winyall.

Regarding Claim 11: The silica gel taught by Winyall in Example III, is made by the inventive process which is said at column 2, lines 18-20 to produce a product, which is substantially spherical with less than 1% of the particles being irregularly shaped.

Regarding Claim 12: The silica gel taught by Winyall in Example III has a particle size distribution from 4-30 microns. This range represents 100% of the particles.

Regarding Claim 13: The silica gel taught by Winyall in Example III has a pore volume of .98 cc/g.

Regarding Claim 14: The silica gel taught by Winyall in Example III and IV have a surface area of 229 and 250 meters squared per gram, respectively.

Regarding Claim 15: The silica gel taught by Winyall in Example III and IV do not substantially include any other metallic elements aside from Sodium impurities, which in the case of Example III accounts for .023% and in Example IV 1.44%. No other metallic impurities are present, where other impurities are sulfate (sulfur: non metal) and volatiles (only volatile used in the process is propane, an organic non-metallic).

Regarding Claim 16 and 18: The silica gel taught by Winyall in Example IV has a particle size distribution as seen in column 4. This particle size distribution was determined using air elutriation, which is an air jet sieving method. The D_{50} particle size is between 0 and 20 microns, wherein over 60% of the particles are included in this range of sizes. One of ordinary skill would reasonably expect that the particles are distributed in a normal distributed and thus the D_{50} value would fall in the upper part of this range, as is evidenced by Example 1, which was made by a similar process, although post treatment was different. In the process of air elutriation, divisions are seen at 40 and 80 microns, meaning that screens with pore diameters of 40 and 80 microns are used to create this distribution.

Response to Arguments

8. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection. Regarding the 102 rejection over Beall alone, which is a reference previously applied in combination forming a 103 rejection, this reference teaches the use of diatomaceous silica, which is a porous silica. The deficiencies noted by combination with Swanson are no longer applicable, as Swanson is no longer relied upon. The new rejection over Felthouse in view of Winyall is based on those claims which **do not necessitate a reaction forming cordierite**. Claim 3 is the only claim requiring such a reaction, and no further claim is dependant on claim 3.

However, if claim 3 were incorporated into claim 1, the rejection over Felthouse in view of Winyall would appear to be overcome.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.A. LORENGO/
Supervisory Patent Examiner, Art Unit 1793

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